

L4 ANSWER 72 OF 74 FEDRIP COPYRIGHT 2005 NTIS on STN  
AN 2005:140874 FEDRIP  
NR AGRIC 0198453

TI **Mycotoxins in Cereal Grains**  
SF Principal Investigator: (head blight)  
Wolf-Hall, C.

*No data available*

CSP NORTH DAKOTA STATE UNIV, VETERINARY & MICROBIOLOGICAL SCIENCES, FARGO,  
NORTH DAKOTA, 58105

FU HATCH |c H

FS Department of Agriculture

SUM 3. Establish integrated strategies to manage and to prevent **mycotoxin** contamination in cereal **grains** Evaluation of physical, chemical and biological approaches for dealing with pre-harvest formed Fusarium mycotoxins and viable mycotoxigenic Fusarium spp. will be completed. Currently, we are evaluating electron-beam radiation and hot water for prevention of Fusarium growth and **mycotoxin** production during the malting of **barley**. We will also evaluate other radiant sources of energy for physical treatments, chemical treatments such as **hydrogen peroxide** and ozone, and biological methods such as addition of antifungal bacterial starter cultures. PR production and decreased malt quality. Methods for treatment of Fusarium infected barley may prevent these safety and quality defects and allow use of otherwise good quality barley. Gaseous ozone and **hydrogen peroxide** were evaluated for effectiveness in reducing Fusarium survival (FS) while maintaining germinative energy (GE) in barley. Gaseous ozone treatments (GOT) included concentrations of 11 and 26 mg/g for 0, 15, 30, and 60 minutes. **Hydrogen peroxide** (HP) treatments included 0, 5, 10, and 15% concentrations with exposure times of 0, 5, 10, 15, 20, and 30 minutes. For GOT, in naturally Fusarium-infected barley, a statistically significant ( $P < 0.05$ ) decrease (24-36%) of FS occurred within 15 minutes of exposure at either concentration. GE was significantly ( $P < 0.05$ ) affected by 30 minutes at both concentrations in naturally Fusarium infected barley, but not in sound barley. GOT did not cause any significant ( $P > 0.05$ ) effect on GE in sound barley at either concentration over the full 30 minute exposure time. For HP, FS was significantly decreased (50-98%) within 5 minutes of exposure. With the exception of two treatments (10% and 15% HP agitated for 20 minutes) GE was not statistically significantly different from the control in naturally Fusarium infected barley. In sound barley, HP had no significant ( $P > 0.05$ ) effect on GE. The results suggest that GOT and HP may have potential for treatment of Fusarium infected malting barley. PB

L4 ANSWER 73 OF 74 FEDRIP COPYRIGHT 2005 NTIS on STN  
AN 2005:130389 FEDRIP  
NR AGRIC 0185362

TI **MARKETING AND DELIVERY OF QUALITY CEREALS AND OILSEEDS**  
SF Principal Investigator: (food quality)  
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FS Department of Agriculture

SUM Objective C of NC-213 Regional Project: quantify and define quality of cereals and oilseeds for various end use markets. Sub-objective C3c: effects of processing on **molds** and **mycotoxins** in **grains**. Specific objectives under Sub-objective C3c: Sub-objective 1. To determine the effect of irradiation on five cultivars of Fusarium infected **barley**. Sub-objective 2. To determine the **mycotoxin** producing ability of surviving Fusarium graminearum isolates taken from irradiated **barley**. Experimental Design Sub-objective 1. This will be a randomized complete block design. Five barley cultivars will be compared for the effect of irradiation on **barley** germination, Fusarium survival, and **mycotoxin**

content. Other variables will be the dosage of radiation (0, 2, 4, 6, 8 and 10 kGy). The treatments will be repeated three times and the results compared. The barley samples showing the most significant decreases in Fusarium levels, while maintaining germinative ability will be malted and the malt tested for amylase activity and mycotoxin content. Sub-objective 2. This will be a completely random design. From the irradiated barley samples, 100 kernels of each will be plated on growth medium to determine the mold populations and their survival rates over a range of irradiation dosages. Isolates representing Fusarium graminearum from the five barley cultivars treated at the different irradiation doses will be taken and grown under defined laboratory conditions. The mycotoxin producing ability will be determined by testing the cultures for DON, 3-acetylDON, 15-acetylDON, and zearalenone. PR malting barley. UV-C irradiation was not found to be effective in eliminating Fusarium infection. Hot water and electron-beam treatments were further studied. Hot water treatments included four temperatures (45, 50, 55, and 60 degrees C) for 0, 1, 5, 10, and 15 min, and electron-beam radiation included dosages of 0-11.4 kGy. For hot water treatments, at 45 degrees C, reductions in Fusarium infection (FI) averaged 97% after 10 and up to 15 min, with no significant reductions in germinative energy (GE). Significant reduction (25%) in GE occurred at 50 degrees C after 5 min, but FI was dramatically reduced after only 1 min. For temperatures 55 and 60 degrees C, significant reductions in GE were seen after 1 minute. With electron-beam radiation, significant reduction in the FI started between 2.3-4.7 kGy. Higher doses (9.2 kGy, and 11.4 kGy) achieved eradication of FI. GE decreased with increase in the electron-beam dosage over 4.5 kGy; however, there was a slight increase in GE at approximately 8 kGy where the GE was not significantly different from that at 0 kGy. We expanded our irradiation study to include different levels of Fusarium infection and malt quality analyses. Irradiation was done at a Surebeam Corporation plant, with dosages of 0, 2, 4, 6, 8 and 10 kGy. Treated samples were malted in a pilot-scale malting unit at North Dakota State University. **Barley** was analyzed for FI, GE, aerobic plate counts (APC), **mold** and yeast counts (MYC) and deoxynivalenol (DON). Malted **barley** samples were analyzed for FI, APC, MYC, and DON. FI decreased with increase in radiation dosage in both the barley and malted samples. In barley samples exposed to 10 kGy, FI was reduced by 50-98%. APC significantly decreased (1-5 logs) in barley with increase in irradiation dosage. A 5-log reduction in APC was observed at 10 kGy for all barley samples. MYC significantly decreased in barley with increase in irradiation dosage. A 1-2.5 log reduction in MYC was observed for all barley samples exposed to 10 kGy. DON was eliminated in malts from barley treated with 2 kGy and higher. APC and MYC in malts from 8-10 kGy treated barleys were slightly higher than in other malts indicating that radiation resistant microflora were able to thrive during malting due to decreased competition. GE in barley samples was significantly decreased (3-15%) at dosages of 8-10 kGy. The results suggest that dosages between 4-8 kGy may be effective in reducing DON in malt while maintaining the GE in barley. Dosages over 8 kGy reduce GE and appear to lead to higher microbial loads in malt. We also evaluated the effect of **hydrogen peroxide** on FI and GE in barley. Treatments included 0, 5, 10 and 15% **hydrogen peroxide** exposure for 0, 5, 10, 15, 20 and 30 minutes. In the 0% control, FI was decreased by 30% after 30 minutes. With 5% **hydrogen peroxide** there was a 79-95% decrease in FI between 5-30 minutes of exposure. GE was only negatively affected with treatments of 10 and 15% **hydrogen peroxide** exposed for 20 minutes. PB

L4 ANSWER 70 OF 74 CAPLUS COPYRIGHT 2005 ACS on STN  
AN 1973:157878 CAPLUS  
DN 78:157878  
TI Disruption of **fungus** cells in fermentation by-products for use  
in animal **feeds**  
IN Kikuchi, Tadaaki; Sugimoto, Hiroshi; Yokotsuka, Tamotsu  
PA Kikkoman Shoyu Co., Ltd.  
SO Jpn. Kokai Tokkyo Koho, 4 pp.  
CODEN: JKXXAF  
DT Patent  
LA Japanese  
FAN. CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI	JP 48005990	B4	19730125	JP 1971-40122	19710609
AB	Fungus cells were treated with 0.1-2.0% H2O2 solution at 110° for 10-60 min to disrupt cell walls. The treated cells with high protein contents were used in animal feeds.				

FILE 'HOME' ENTERED AT 15:06:32 ON 22 AUG 2005

=> file food

COST IN U.S. DOLLARS

SINCE FILE

TOTAL

ENTRY

SESSION

FULL ESTIMATED COST

0.21

0.21

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=> s (mycotoxin or fungus or mold) and (grain or barley or wheat or feed)  
13 FILES SEARCHED...

L1 156009 (MYCOTOXIN OR FUNGUS OR MOLD) AND (GRAIN OR BARLEY OR WHEAT OR  
FEED)

=> s l1 and hydrogen peroxide  
L2 511 L1 AND HYDROGEN PEROXIDE

=> s s (mycotoxin or fungus or mold) (10a) (grain or barley or wheat or feed) and  
hydrogen peroxide

MISSING OPERATOR 'S (MYCOTOXIN'

The search profile that was entered contains terms or  
nested terms that are not separated by a logical operator.

=> s (mycotoxin or fungus or mold) (10a) (grain or barley or wheat or feed) and  
hydrogen peroxide

13 FILES SEARCHED...  
L3 139 (MYCOTOXIN OR FUNGUS OR MOLD) (10A) (GRAIN OR BARLEY OR WHEAT  
OR FEED) AND HYDROGEN PEROXIDE

=> dup rem l3  
DUPLICATE IS NOT AVAILABLE IN 'FEDRIP, FOREGE, NUTRACEUT'.  
ANSWERS FROM THESE FILES WILL BE CONSIDERED UNIQUE  
PROCESSING COMPLETED FOR L3  
L4 74 DUP REM L3 (65 DUPLICATES REMOVED)

=> d 1-74 bib ab

=> d his

(FILE 'HOME' ENTERED AT 15:06:32 ON 22 AUG 2005)

FILE 'AGRICOLA, BIOSIS, BIOTECHNO, CABA, CAPLUS, DISSABS, FEDRIP, FOMAD,  
FOREGE, FROSTI, FSTA, JICST-EPLUS, NTIS, NUTRACEUT, PASCAL, PROMT,  
SCISEARCH, TOXCENTER' ENTERED AT 15:06:43 ON 22 AUG 2005

L1 156009 S (MYCOTOXIN OR FUNGUS OR MOLD) AND (GRAIN OR BARLEY OR WHEAT O  
L2 511 S L1 AND HYDROGEN PEROXIDE  
L3 139 S (MYCOTOXIN OR FUNGUS OR MOLD) (10A) (GRAIN OR BARLEY OR WHEAT  
L4 74 DUP REM L3 (65 DUPLICATES REMOVED)

=>

=> s (mycotoxin or fungus or mold) (10a) hydrogen peroxide (20a) (grain or barley  
or wheat or sorghum)

12 FILES SEARCHED...

L5 38 (MYCOTOXIN OR FUNGUS OR MOLD) (10A) HYDROGEN PEROXIDE (20A)  
(GRAIN OR BARLEY OR WHEAT OR SORGHUM)

=> dup rem l5

DUPLICATE IS NOT AVAILABLE IN 'FEDRIP, FOREGE, NUTRACEUT'.

ANSWERS FROM THESE FILES WILL BE CONSIDERED UNIQUE

PROCESSING COMPLETED FOR L5

L6 24 DUP REM L5 (14 DUPLICATES REMOVED)

=> d his

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FILE 'AGRICOLA, BIOSIS, BIOTECHNO, CABA, CAPLUS, DISSABS, FEDRIP, FOMAD,  
FOREGE, FROSTI, FSTA, JICST-EPLUS, NTIS, NUTRACEUT, PASCAL, PROMT,  
SCISEARCH, TOXCENTER' ENTERED AT 15:06:43 ON 22 AUG 2005

L1	156009 S (MYCOTOXIN OR FUNGUS OR MOLD) AND (GRAIN OR BARLEY OR WHEAT O
L2	511 S L1 AND HYDROGEN PEROXIDE
L3	139 S (MYCOTOXIN OR FUNGUS OR MOLD) (10A) (GRAIN OR BARLEY OR WHEAT
L4	74 DUP REM L3 (65 DUPLICATES REMOVED)
L5	38 S (MYCOTOXIN OR FUNGUS OR MOLD) (10A) HYDROGEN PEROXIDE (20A) (
L6	24 DUP REM L5 (14 DUPLICATES REMOVED)
L7	13 S (FUNGUS OR MOLD OR MYCOTOXIN) (10A) HYDROGEN PEROXIDE (20A) (S

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	283	(fungus or mold or mycotoxin) and hydrogen adj peroxide and (feed or brley or sorghum or corn or wheat or fodder or hay or silage)	USOCR	OR	ON	2005/08/22 15:50
L2	116	((fungus or mold or mycotoxin) same hydrogen adj peroxide) and (feed or barley or sorghum or corn or wheat or fodder or hay or silage)	USOCR	OR	ON	2005/08/22 16:14
L3	251	((fungus or mold or mycotoxin) same hydrogen adj peroxide) and (feed or barley or sorghum or corn or wheat or fodder or hay or silage)	US-PGP UB; USPAT	OR	ON	2005/08/22 16:14
L4	0	((fungus or mold or mycotoxin) same hydrogen adj peroxide) and (feedstuff)	USOCR	OR	ON	2005/08/22 16:14
L5	252	((fungus or mold or mycotoxin) same hydrogen adj peroxide) and (feed or feedstuff or barley or sorghum or corn or wheat or fodder or hay or silage)	US-PGP UB; USPAT	OR	ON	2005/08/22 16:29
L6	6	("3979283"   "4478683"   "4554075"   "4588506"   "4623465"   "4665926").PN.	US-PGP UB; USPAT; USOCR	OR	ON	2005/08/22 16:20



L7	16	((fungus or mold or mycotoxin) same hydrogen adj peroxide) and (feed or feedstuff or barley or sorghum or corn or wheat or fodder or hay or silage)	EPO; JPO; DERWEN T	OR	ON	2005/08/22 16:31
L8	6	((fungus or mold or mycotoxin) same hydrogen adj peroxide) same spray\$3	EPO; JPO; DERWEN T	OR	ON	2005/08/22 16:31
L9	35	((fungus or mold or mycotoxin) same hydrogen adj peroxide) same spray\$3	US-PGP UB; USPAT	OR	ON	2005/08/22 16:34
L1 0	98	((fungus or mold or mycotoxin) same hydrogen adj peroxide) same spray\$3	USOCR	OR	ON	2005/08/22 16:35
L1 1	1	((fungus or mold or mycotoxin) with hydrogen adj peroxide) with spray\$3	USOCR	OR	ON	2005/08/22 16:35